DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

Date . MAR 3 1986

From Acting Director
Office of Health Assessment

Subject Reichold-Varcum Chemical
Niagara Falls, New York

To Mr. William Q. Nelson
Public Health Advisor
EPA Region II

EXECUTIVE SUMMARY

Data from preliminary soil and groundwater sampling were evaluated for potential health impacts. Contaminant concentrations in the soils do not pose an imminent health threat to those working on-site provided typical safety precautions are followed and normal hygiene is practiced. The soil contaminants do not appear to be a health threat to off-site receptors. Groundwaters beneath the site are contaminated, primarily by phenolic compounds and heavy metals. Although the associated health threat is unclear at this time, the contaminant levels warrant concern for potential consumers. The current Environmental Protection Agency (EPA) groundwater contamination study in the Niagara Falls area should be continued.

BACKGROUND

Reichold-Varcum Chemical is a 9-acre, phenolic resin manufacturing facility located in a highly industrial and commercial section of Niagara Falls, New York. Prior to 1979, phenolic process wastes were settled in an unlined pond. This pond was removed and the soil excavated to bedrock in 1979. Monitoring wells installed on-site have revealed the presence of phenols and several other organic chemicals in the groundwater beneath Reichold-Varcum Chemical.

In July 1985, preliminary groundwater, surface water, and soil samples were collected at the site to determine the presence of hazardous chemicals. The EPA, Region II, is requesting the Agency for Toxic Substances and Disease Registry (ATSDR) to evaluate the data for potential public health implications.

DOCUMENT REVIEWED

NUS CORPORATION, Letter to EPA Region II, "Presentation of Analytical Data from Reichold-Varcum Chemical, Niagara Falls, New York," November 13, 1985.

PRINCIPAL CONTAMINANTS

Five groundwater samples, three surface soil samples, and one process water effluent sample were collected. Three of the groundwater samples were taken from bedrock wells and the other two from overburden wells, all on the Reichhold-Varcum property.

The predominant groundwater contaminants were phenols and substituted phenolic compounds ranging in concentration to 1900 mg/1. In addition, xylenes (ranging to 1100 ug/1), ethylbenzene (1900 ug/1), toluene (210 ug/1), benzoic acid (460 ug/1), and numerous other organics (concentrations less than 100 ug/1) were detected in one or more samples. The concentrations of arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, silver, and zinc exceeded National Interim Primary Drinking Water Regulation (NIPDWR) or Secondary Drinking Water Regulation (NSDWR) maximum contaminant levels (MCL) for drinking water in one or more of the groundwater samples.

The principal soil contaminants were also phenol and substituted phenolic compounds ranging in concentrations to 470 mg/kg. Di-n-butylphthalate (620 mg/kg) was detected in one sample and numerous organics (concentrations less than 50 ug/kg) were found in one or more soil samples. Although arsenic, copper, lead, magnesium, and mercury exceeded typical median concentrations for natural soils, only magnesium was outside of the typical range for natural soils.

The process wastewater discharge contained phenol and substituted phenolic compounds in concentrations up to 3600 mg/1. Ethylbenzene (3700 ug/1), xylenes (15000 ug/1), 4-Methyl-2-Pentanone (2100 ug/1), and 11 inorganic compounds were also detected.

Reportedly, methylene chloride, acetone, 2-butanone and bis(2-ethylhexyl) phthalate were detected in the analytical laboratory's method blank. Because of this, their presence in the samples is suspect. These contaminants are not discussed within this review.

EXPOSURE PATHWAYS

The primary potential exposure pathway for this site is ingestion of contaminated groundwater and, to a lesser degree, the associated pathways of dermal absorption and inhalation during contact (e.g., bathing) with contaminated groundwater. Secondary potential exposure pathways include ingestion of contaminated soils, inhalation of contaminated dusts, or dermal absorption during direct contact with contaminated soils.

Although there appears to be a potential for off-site exposures to migrating contaminants, particularly with respect to ingestion of contaminated groundwaters, such scenarios could not be evaluated using the limited information provided. Aside from the ingestion of contaminated groundwater, the primary receptors are limited to those working on-site and, basically, only those working with contaminated soils.

ENVIRONMENTAL PATHWAYS

Only preliminary soil and groundwater samples were collected. Because the data base is essentially limited to a few samples, and detailed site information was not provided, we cannot comment at this time on potential environmental pathways.

DISCUSSION

Process Wastewater Effluent

One process wastewater effluent sample was collected. Reichold-Varcum Chemical discharges process wastewaters to city sewers. Such discharges are regulated by appropriate pretreatment or other point source standards and usually are not Superfund related. While the levels of inorganic and organic pollutants reported for this sample may be of concern for the publicly-owned treatment works

(POTW) to which the sewer discharges, public exposure to these contaminants is unlikely. Therefore, the process wastewater effluent contaminants are not considered to be a public health threat.

Soils

For this facility, exposures to contaminated soils are probably insignificant compared to occupational exposures to the contaminants themselves. In particular, the potential for ingesting soils is much lower than the potential for accidental ingestion while working with a process compound. Therefore, the relative risks resulting from ingestion of contaminated soils cannot be determined using the more traditional approaches applied to residential exposures. Calculating the daily intake of a 70 kg man ingesting 0.1 gm of soil and comparing that to the acceptable daily intake (ADI) for a particular contaminant is unreasonable for an industrial site. Typical safety precautions and adult hygienic practices should preclude all but incidental ingestion of soils. Furthermore, contaminant concentrations in the soils are not at a level where we would expect to see acute toxic responses resulting from incidental ingestion.

Inhalation of contaminant-entrained dusts is the most likely potential exposure pathway, but only under scenarios where large quantities of fugitive dusts are generated and the duration of exposure is extended. Fugitive dusts are difficult to characterize, both in respect to generation and potential contaminant concentrations. However, mitigation of fugitive dust generation is generally rather simple, and control of exposures comes with control of the source.

Ordinary measures taken to protect the health and safety of those on-site (e.g., gloves and respirators when working in dusty areas) should be sufficient to prevent all but incidental exposure to the contaminated soils. To further control avoidable exposures, access to the site should be restricted to reduce unnecessary pedestrian traffic.

We have no information which would enable us to evaluate the off-site migration of the soil contaminants or the potential for off-site exposures. In general, contaminants could be transported through runoff, wind action, or infiltration to groundwaters. Without a definitive site description, comments on the effects of such migration would be only speculative at this time.

Groundwater

Based on the preliminary sampling data received, groundwaters beneath the Reichold-Varcum site are contaminated, primarily with phenolic compounds and various heavy metals. Beyond this statement, very little can be said about potential migration or potential exposures because we have no hydrogeologic, demographic, topographic, etc., information to evaluate.

While it is unlikely these groundwaters are consumed, the unpleasant aesthetic and organoleptic qualities imparted by iron and phenol alone would preclude drinking, there may be a potential for a contaminant plume to extend off-site, affecting residential or public drinking water wells. Since the city of Niagara Falls obtains its drinking water from nearby surface waters (Niagara River), the issue of contaminating public drinking water wells is moot. The on-going EPA study of groundwater contamination in the Niagara Falls area should provide additional data on the extent of contaminant migration from this and other sites in the vicinity.

CONCLUSIONS

1. Contaminated soils do not pose an imminent health threat to those working on-site (assuming necessary care is already taken to insure the health and safety of those working in dusty areas).

2. Contaminated soils do not appear to pose an imminent health threat to off-site receptors.

3. Groundwaters beneath the site are contaminated, primarily by phenolic compounds and heavy metals.

4. The public health implications of the contaminated groundwater are unclear at this time. However, the contaminant levels warrant concern for potential consumers.

RECOMMENDATION

Continue the current EPA program to investigate groundwater contamination in the Niagara Falls area.

We hope this information is useful to you.

Stephen Margolis, Ph.D.